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Full Length Article

Factoring as a determinant of capital structure for large firms: Theoretical and empirical analysis

Rumeysa Bilgin [a,*], Yusuf Dinc [b]

[a] Department of International Trade & Finance, Istanbul Sabahattin Zaim University, Halkalı Cad. No: 2, Kucukcekmece, 34303, Istanbul, Turkey
[b] Department of Islamic Banking & Finance, Istanbul Sabahattin Zaim University, Halkalı Cad. No: 2, Kucukcekmece, 34303, Istanbul, Turkey

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Abstract

Firms engage in factoring as an external financing option. Factoring is generally considered as a costly option. However, firms may prefer factoring financing when they reach a certain level of indebtedness that increasing it may negatively affect their firm value. Up to now, far too little attention paid on the role of factoring on the capital structure decisions. This paper is the first attempt to provide a theoretical framework and empirical evidence on the role of factoring as a determinant of capital structure. A Fractional Regression Model is estimated using a sample of 261 publicly listed firms in Turkey for the 2012–2017 period. The empirical evidence presented in this paper implies that factoring does not effect on the initial decision of leveraging, whereas it is a determinant of capital structure for leveraged firms. Another significant finding is the existence of the relationship between increasing factoring and increased leverage.

JEL classification: G20; G23; G32

Keywords: Factoring; Capital structure; Two-part fractional regression model

1. Introduction

Firms from emerging economies are heavily dependent on debt financing. The bank loan is the primary conventional tool of borrowing in these economies. Therefore, it is the first choice for firms to meet their external financing needs. Recently, factoring financing gained importance as an alternative source of external finance. It can be defined as the process of a firm's raising immediate cash either by selling its account receivables to a third party or by pledging these receivables as collateral on loan. However, it carries an interest cost and can be used as a tool for leverage. Our objective in this study is to clarify the role of factoring as a determinant of capital structure and as an external finance option beside the bank loan and equity financing. To our knowledge, the role of factoring financing on the capital structure decisions of publicly listed firms has not been studied using firm-level quantitative data yet. This study aims to fill this gap by investigating the importance of factoring financing for capital structure decisions of Turkish non-financial publicly listed firms.

In doing so, we take into account a number of recent issues in the empirical literature on capital structure. Firstly, a distinction should be made between the decision of whether or not a firm should issue debt and the process of determining how much debt a leveraged firm should issue. These two questions must be investigated individually and the results of the capital structure related studies, which ignore this distinction, should be taken with caution. Secondly, it is common practice to use linear regression models with fractional dependent variables in capital structure research. The conditional expectation of a fractional dependent variable is a

* Corresponding author.
E-mail addresses: rumeysa.bilgin@izu.edu.tr (R. Bilgin), yusuf.dinc@izu.edu.tr (Y. Dinc).
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nonlinear function of the explanatory variables. Thus, when a linear method is used, the model becomes miss-specified. Ramalho and da Silva (2009) address this methodological problem using a non-linear fractional regression model approach developed by Papke and Wooldridge (1996). The later suggests a robust quasi-maximum likelihood (QML) method for regression models with fractional dependent variables with a finite number of boundary observations. The two-part fractional regression model (2-part FRM) approach developed in Ramalho and da Silva (2009) and Ramalho, Ramalho, and Murteira (2011) addresses these issues. Therefore, their approach is used in this study.

A striking finding to emerge from the analysis is that factoring financing have no effect on unleveraged firms' initial decision to issue debt. This result supports our argument that factoring is not used as an alternative external source of financing besides equity financing for unleveraged firms. When the analysis is repeated with a sample consisting of only leveraged firms, a significant positive relationship between leverage ratio and factoring financing is found.

The rest of the paper is organized as follow. Factoring financing is discussed in the following section. Section 3 contains a review of capital structure and factoring literature. The hypotheses, sample and methodology are explained in sections 4, 5 and 6, respectively. Empirical results are given in section seven, and lastly, section eight concludes the study.

2. Factoring financing

Factoring became an important external financing source for firms operating in emerging economies. Especially in Turkey, the volume of factoring firms within non-bank financial institutions increased in recent years. As of 2017, the sector has more than 100 k customers and a turnover of 145 billion TRL. The sector's global volume in the same period is at the level of 3.1 trillion USD according to Factors Chain International (FCI). Besides, factoring firms' total assets reached 1.4% of the total assets of the banking sector while their total receivables is 2% of the banking sector. To sum up, factoring sectors have become important actors around the world. Hence, the role of factoring as a source of external finance should be taken into account in capital structure studies.

Factoring has reached an important position in the non-bank financial sector as well. It plays a key role in the financing of the real economy. Table S1 shows data on key variables for 2017 in TRL term (See the supplementary material, available online). After the latest regulation on factoring in 2007, the sector is improved in terms of corporate governance and capital adequacy. The regulation regarding the compulsory invoicing has increased the solidity of the sector.

Since factoring firms have no authority to collect funds, they are dependent on other financial institutions for their own financing. This constraint causes an extra margin on the financing cost of their customers compared to the banks'. However, the cost of factoring can be deduced from tax and firms can manage their factoring cost by increasing their sale prices.

Factoring may be considered as a secondary credit source compared to banks in Turkey. Because of %85 percent of factoring sector loans generated through their own borrowings from banks. As a result, the sector's transaction cost is normally higher than the banking sector's.

Unlike bank loan financing, the crowding-out effect does not exist for factoring financing. This effect can be defined as a search for a yield higher than the financial intermediation cost. This cost results from the inability to be frictionless as explained in the Arrow-Debreu model (Burdet et al., 2001). Factoring firms are dependent on bank financing. Thus, an additional margin of friction is expected for factoring financing cost. The yield itself is normally higher than the potential crowding-out profitability for factoring firms. As a result, the crowding-out effect will not emerge for factoring financing. As well, these institutions' business models are based on specific expertise but not on trading financial instruments. This allows uninterrupted financing opportunities for their customers. However, the indirect crowding-out effect may occur, if factoring firms themselves are subject to crowding-out when public debt instruments' yield exceed the market rates for a bank loan.

Factoring financing has several advantages compared to other financing options. Especially, it can be viewed as a preferable solution for firms when they reach the limits of their bank credit lines or when they need to insure their collection process. Firms also use factoring as a tool for cash flow management by organizing the timing of their cash flows. A firm's assets become more liquid with the immediate collection of the receivables. Besides, factoring firms are source for credibility check of their customers' receivables. They also may follow the legal process if the receivable cannot be collected depending on whether the transaction is made as recourse or non-recourse. Furthermore, firms opt for the factoring financing for window-dressing on their balance sheet. When they engage in factoring, leverage ratios remain constant in terms of balance sheets even though indebtedness increases. Thus, firms can give the impression that they have a much stronger financial structure than they really are.

Because of the aforementioned advantages, factoring is a preferred external finance option for many firms. Especially SMEs heavily depend on it (Soufani, 2002). For large-size firms, while the bank loans remain as the main source of financing owing to its collateral flexibility, factoring is a less frequently used source of financing. They may turn to factoring because of bank credit line limit constraints and for the purpose of window-dressing of their balance sheets. Large-size firms may resort to non-bank financing like factoring particularly when they reach to their non-collateralized risk limits. Hence, they may compensate for higher costs of factoring by utilizing its side benefits.

Large firms also use window-dressing as an extra advantage of factoring. Both International Financial Reporting Standards (IFRS) and Turkish Accounting Standards (TAS) states that factoring transactions must be reported within

"receivables". While the factoring debts themselves are not reported in a loan portfolio, its interest and financing cost is monitored under the financing expenses in the income statement. Doing this, firms report a lower than the actual leverage ratio. From this perspective, it is not easy to analyze the place of factoring transactions within the debt structure of firms. However, the significant size of the factoring sector indicates that there is a need to further investigation of factoring as an external financing source beside bank loan and equity financing.

3. Literature

According to Modigliani and Miller's (1958) value-irrelevance proposal, a firm's capital structure does not affect its value. This view is valid only under some unrealistic assumptions. It is a well-known fact that managers can alter the value of a firm with their strategic financing decisions. This relationship is explained by taxes, asymmetric information and agency cost in the literature (Myers, 2001). The well-known capital structure theories such as trade-off, pecking order, and free cash flow are differing from each other according to their emphasis on these factors.

Trade-off theory argues that firm value can be increased by using the tax advantage of interest (Modigliani & Miller, 1958; 1963). Each firm has an optimal capital structure, which can be described as the leverage ratio where the marginal tax benefit of debt is equal to the marginal bankruptcy cost of debt (see Fig. S1, available online).

On the other hand, pecking order theory highlights the asymmetric information problems between managers and investors (Myers & Majluf, 1984). According to this view, firms follow a financing hierarchy when they make their capital structure decisions because of the relative cost of each option. Their first choice is to use internal cash for their investments since its cost is the lowest. If they need external finance, they prefer debt financing to equity financing since the former is less expensive than the later (see Fig. S2, available online). Equity financing is considered as the last resort for funding.

The agency problem between managers and shareholders, which is not taken into consideration in the two previous theories, is the starting point of the Free Cash Flow Hypothesis. Jensen (1986) shows that the purpose of pushing managers to use debt is to discipline their spending. The leverage ratio is expected to be higher for profitable firms, preventing their managers from unnecessarily spending.

Empirical studies on capital structure try to answer the question of how firms make their capital structure decisions in light of the aforementioned capital structure theories. The most important discovery of these studies is a number of so-called capital structure determinants (Graham & Leary, 2011; Parsons & Titman, 2007).

Profitability, asset tangibility, firm size and growth opportunity are the generally accepted firm-specific capital structure determinants. (see Alves & Ferreira, 2011; Antoniou, Guney, & Paudyal, 2008; Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001; De Jong, Kabir, & Nguyen, 2008; Fan, Titman, & Twite, 2012; Frank & Goyal, 2009; Harris & Raviv, 1991; Rajan & Zingales, 1995; Utrero-González, 2007; Venanzi, Naccarato, & Abbate, 2014).

A number of other firm-level factors (such as non-debt tax shield, CEO compensation, liquidity, bank concentration, firm age, board structure, growth option exercise), among others, are investigated as potential drivers of capital structure (see Amiyatosh & Uday, 2018; Antoniou et al., 2008; DeAngelo & Masulis, 1980; González & González, 2008; John & John, 1993; Kieschnick & Moussawi, 2018; Ramalho, Rita, & da Silva, 2018). This study contributes to the empirical capital structure literature by assessing the role of factoring as a capital structure determinant.

Very little was found in the literature on the use of factoring as an external financing source. These studies on factoring financing have suffered from shortcomings in the methods used to collect factoring data. Since factoring debts are kept under account receivables in the balance sheets, it is not easy to track a firm's degree of involvement in factoring financing. Therefore, qualitative methods like surveys are frequently used in the literature (Mol-Gómez-Vazquez et al., 2018; Soufani, 2002; Faraq, 2013) Moreover, previous studies focus mostly on small and medium size enterprises (SMEs) and conclude that factoring financing has advantages beyond other external finance options. (Asselbergh, 2002; Bakker, Udell, & Klapper, 2004; Kozarević & Hodžić, 2016; Mare, 2008; Shuzhen, Liang, & Zheng, 2014). Besides, contrary to the perception that factoring financing is applied for as a last resort, Asselbergh (2002) finds out that factoring is preferred by newly founded firms with high growth opportunities and a high cost of capital. This result implies the simultaneous use of factoring and other financing options.

However, previously mentioned studies point out that factoring financing is mainly preferred by SMEs as a source of external financing, Soufani (2002) shows that large-scale firms can also opt for factoring their receivables when they are profitable enough to bear its costs.

Similarly, Mol-Gómez-Vazquez et al. (2018) find that in countries with low creditor rights protection, factoring financing is more prevalent. As it is pointed out by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) and Djankov, McLiesh, & Shleifer, 2007, leverage ratios are higher in economies with low creditor rights protection. This finding implies a positive relationship between leverage and factoring financing. Mol-Gómez-Vazquez et al. (2018) also notice that factoring could be supplementary or an alternative to a bank loan. They argue that factoring can be used as a solution to the agency problems since the information asymmetry problem is not a concern for the factor if the quality of the account receivable is ensured.

To sum up, factoring financing is a frequently applied solution for SMEs due to the asymmetric information problem. Large-scale firms also use this external finance option when they can bear its costs. In this case, the capital structure of these firms will be affected by factoring financing.

4. Hypotheses

According to the trade-off theory, a firm's value can be increased by using the tax advantage of interest. Interest expense of factoring financing provides an extra tax-shield for the firms and increase their value. Furthermore, it is not detectable in financial statements to be considered in the leverage estimation. Thence, the total debt amount of the firm in the balance sheet will not increase with increasing factoring. As a result, it can be thought that the bankruptcy cost of the firm will not be affected by the factoring process. Firms may opt for factoring when they reach a level of leverage ratio that increasing it may negatively affect the firm value. Thus, a positive relationship between leverage ratio and factoring is naturally expected.

Fig. 1 shows an overview of the effect of leverage and factoring financing on the firm value. It is clear from the figure that; the firm value will increase with increasing debt for a leveraged firm until it reaches its optimal leverage ratio. Then, factoring is used as a way to increase firm value without increasing the bankruptcy cost. The increase in the firm value caused by factoring financing can be defined as "optimal leverage ratio maintenance effect". The magnitude of this maintenance effect is decided by the depth of the factoring market. When the firm utilizes all of the factoring financing possibilities in the market, further bank loan financing and equity financing are employed simultaneously to maintain the optimal capital structure.

According to the pecking order approach, factoring financing should be an option between debt and equity since its cost placed between these two alternatives. Thus, once firms decide to use external finance, their first choice will be borrowing from a bank. When firms exhausted their limit of non-collateralized credit lines, the non-interest cost of bank debt will increase. At some point, the cost of factoring may be equal or lower to the cost of bank loan. Then, firms may opt for factoring before switching to the next financing option (equity) in the hierarchy. This order is followed whenever a firm need to raise funds externally. Based on this reasoning, we can conclude that factoring can be placed between the bank loan and equity financing options in a reordered pecking order hierarchy (see Fig. 2). Similar to the trade-off view, a positive relationship between leverage ratio and factoring may be expected according to the pecking order hypothesis.

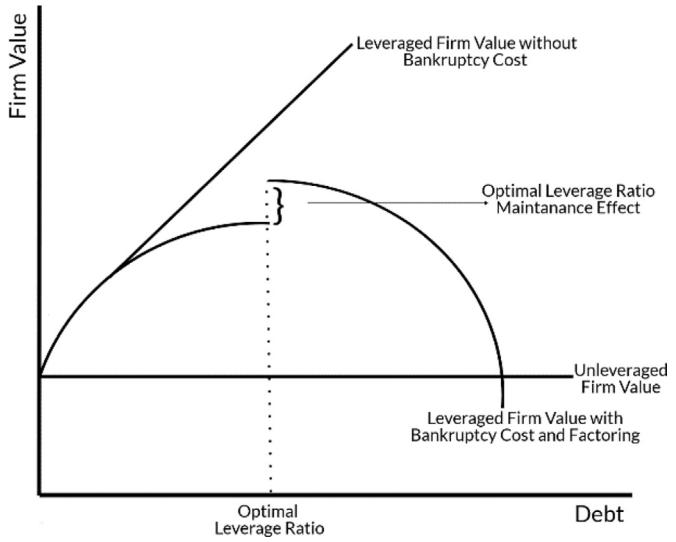

Fig. 1. Effects of leverage and factoring financing on the firm value.

This line of reasoning suggests that both trade-off and pecking order theories should be taken into account when considering the effect of factoring on the capital structure decisions of firms. The relationship between leverage and factoring can only be fully explained by blending both theories. When window-dressing is the main motive behind the factoring financing, it can be said that the firm has an optimal capital structure besides the financing hierarchy.

Factoring debt enables managers to have immediate cash for debt-rollover. Managers of highly leveraged firms may use factoring as a tool to manipulate capital structure imposed by shareholders. So that, free cash flow hypothesis also suggests a positive relationship between leverage ratio and factoring financing.

To sum up, in light of the discussion given above, the null hypotheses H_0 is tested against the alternative.

H0. : There is no relationship between a firm's leverage ratio and its factoring financing

H1. : There is a positive relationship between a firm's leverage ratio and its factoring financing.

5. Data

Our dataset comprises Turkish publicly listed non-financial firms with a positive shareholder's equity value. Information related to the receivables factoring is collected from the auditing reports published by Public Disclosure Platform (KAP) of Turkey and CBRT Database. Other firm-level balance sheet and income statement data are extracted from Compustat Global Database. The sample panel data set comprises of 261 publicly listed firms for the years 2012–2017. Detailed variable descriptions are presented in Table S2 (See the supplementary material, available online).

The leverage ratio is used as our dependent variable. Welch (2011) showed that since firms have obligations outside the financial (interest-bearing) debt, the leverage ratio, measured as a ratio of the financial debt to total assets will not reflect the firm's real choice of debt financing. The denominator of this ratio includes equity capital, financial debt and non-financial debt. In this case, the leverage ratio will also be low for firms with high non-financial liabilities as well as for firms that prefer equity financing. For this reason, the leverage ratio in this study is measured as a share of financial debt in total capital of the firm where financial debt is defined as the book value of short-term and long-term interest-bearing debt, and total capital represents the total investment in the company. It

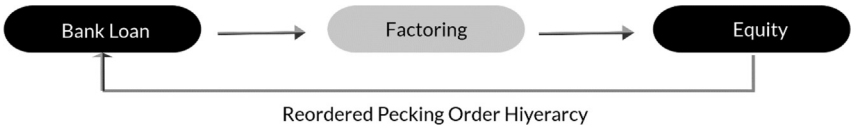

Fig. 2. Reordered pecking order theory.

consists of financial debt plus shareholder's equity. Both book and market leverage ratios are estimated. For book leverage ratio, shareholder's equity is estimated as the sum of common equity, preferred stock, minority interest, long-term interest-bearing debt, short-term interest-bearing debt, non-equity reserves and deferred tax liability in untaxed reserves. For market leverage ratio, shareholder's equity is estimated by multiplying the number of shares with the year-end closing price of the stock.

Factoring financing is proxied by natural logarithm of the outstanding factoring debt for each year. According to trade-off theory, firms have an optimal leverage ratio. Once a firm reaches this level, issuing more debt becomes costly and non-preferable. At this point, factoring may be used as an extra source of debt financing. When firms use factoring, their leverage ratio will not increase in a way that can be detected from their balance sheet. In other words, publicly listed firms use factoring for window-dressing of their balance sheets. Hence, we are expecting a positive relationship between leverage ratio and factoring financing.

Profitability, firm size, tangibility, liquidity, non-debt tax shield, industry leverage, inflation rate and GDP growth rate are employed as control variables. These are the most well-known firm-level determinants of capital structure.

Profitability is measured as the ratio of earnings before interest and taxes to total assets. The trade-off theory argues that profitable firms can borrow at a lower rate due to their low risk of bankruptcy. On the other hand, according to the pecking order theory, the more profitable is a firm, the less debt it uses. Since the empirical findings in the literature generally support the pecking order view, a negative relationship between profitability and leverage ratio is expected in this study, as well.

Firm size is measured as the natural logarithm of total assets. Tangibility is estimated as the ratio of fixed assets to total assets. These two are used as proxies of the firm's credibility in the debt market and factors that lower the cost of debt. The probability of bankruptcy is lower for large firms. Besides, in the case of bankruptcy, tangible assets are sold to satisfy the creditors' claims. Both trade off and pecking order theories suggest positive effects of firm size and tangibility on leverage ratio. Previous literature supports these arguments. We expect a positive relationship between firm size and leverage.

Liquidity is measured as the ratio of current assets to current liabilities. It is a proxy for the availability of internal funds. Firms with high current ratios are assumed to need less external financing. According to pecking order theory, firms with high current ratios use less debt. Alternatively, the free cash flow hypothesis argues that firms with more liquid resources should use more debt to discipline their managers from wasting excess cash flows. In accordance with the previous literature, we expect a negative relationship between current ratio and leverage.

Trade-off theory states that firms opt for debt financing to benefit from the tax advantage of debt financing. This temptation loses its importance when firms have large non-debt tax shields. Thus, a negative relationship between leverage ratios and non-debt tax shield is expected.

It is a generally accepted fact that leverage ratios vary within industries. Firms in industries with high mean leverage ratios tend to be more leveraged. Thus, the industry leverage variable is included in the model to capture the inter-industry variation.

In order to cover the effect of macroeconomic factors, inflation rate and GDP growth rate variables are also included in the model. When current inflation is high, the uncertainty about the future will draw back managers from issuing more debt. During economic expansions, firms profit increase and taxable income increase. Thus, firms prefer to issue more debt when the GDP growth rate increases. Descriptive statistics on all variables are presented at Table S3 and descriptive statistics on factoring variable by industry are given at Table S4 (See the supplementary material, available online).

6. Methodology

The empirical literature on a firm's capital structure employs the leverage ratio for the regressand in the form of a fractional variable. Recently, discussions in the literature begin on econometric issues arising from the application of linear regression models in capital structure research (Ramalho & da Silva, 2009; Kieschnick & Moussawi, 2018). It is highlighted that the conditional expectation of leverage ratio can hardly be linear since it is a bounded fractional variable,

$$E(y|X) = G(X\beta) \tag{1}$$

where y is the vector of leverage ratio, X is the matrix of all independent variables including the constant term and β is the vector of coefficients. A proposed solution is to use non-linear least squares estimation method to estimate equation (1). Alternatively, the special quasi-maximum likelihood (QML) estimation method of Papke and Wooldridge (1996) can be used with a suitable functional form assumption for the dependent variable. The crucial point here is to assume a correct specification for $G(.)$. Papke and Wooldridge (1996) defines $G(.)$ as a cumulative distribution function which satisfies,

$$0 < G(z) < 1 \qquad \textit{for all } z \in \mathbb{R}$$

They propose a logistic function for $G(.)$ and assume a Bernoulli distribution for y. The Bernoulli log likelihood function is,

$$LL(\beta) = y \log[G(X\beta)] + (1-y)\log[1 - G(X\beta)] \quad (2)$$

As long as $G(.)$ is specified correctly, the resulting QML estimator of β is consistent (Gourieroux, Monfort, & Trognon, 1984).

Ramalho and da Silva (2009) and Ramalho et al. (2011) developed a two-part fractional regression model approach for empirical capital structure research. With this approach, both the existence of zero leverage phenomenon and the fractional nature of the leverage ratios are taken into account. In our study, their two-part fractional regression model approach is employed. The first model is the binary response model, which can be defined as:

$$Y^* = \begin{cases} 0 \, for \, Y = 0 \\ 1 \, for \, Y \in (0,1] \end{cases}$$

$$P(Y^* = 1|X) = P(Y \in (0,1]|X) = F(X\theta) \quad (3)$$

where Y^* is the binary leverage ratio variable which takes the value of 0 for an unleveraged firm and takes the value of 1 for a leveraged firm. θ is a vector of variable coefficients and $F(.)$ is the link function. Lastly, X is the matrix of all control variables and the factoring variable. Following Ramalho and da Silva (2009), the binary model is estimated with QML estimator. The model is used to investigate the role of factoring in the publicly listed firms' decisions of whether or not resort to debt financing in the first place. According to our argument, factoring does not affect debt decision at this stage. Thus, no significant relationship is expected between binary leverage ratio variable and factoring variable.

The second model is the fractional regression model, which can be defined as:

$$E(Y|X, Y \in (0,1]) = G(X\gamma) \quad (4)$$

where Y is a fractional leverage ratio variable estimated only for leveraged firms which can have a value between 0 and 1. γ is a vector of variable coefficients and $G(.)$ is a link function. This second model is also estimated with QML (Ramalho & da Silva, 2009). The role of factoring in decision of the publicly listed leveraged firms on how much debt to use is investigated using the fractional regression model. We assume that factoring has an effect on debt decision at this second stage. The firms with higher leverage ratios are expected to use factoring as an alternative source of financing. Hence, they tend to raise external funds from factoring financing without increasing their leverage ratios. Thus, a significant positive relationship between fractional leverage ratio variable and factoring variable is expected.

It is straightforward to extend this work to panel data. Papke and Wooldridge (2008) showed how to estimate fractional regression model with large N, small T panel data sets. Let's assume that y_{it}, is a dependent variable which takes values within the range of.

$0 \geq y_{it} \geq 1$. The expected value of that y_{it} can be written with independent variables matrix x_{it} and individual effects vector c_i as,

$$E(y_{it}|x_{it}, c_i) = F(x_{it}\beta + c_i) \quad (5)$$

Papke and Wooldridge (2008) suggest a standard normal cumulative distribution for the link function $F(.)$. For the sake of simplicity, exogeneity assumption can be made for $E(x_{it}|c_i)$. Besides, it is reasonable to assume heteroscedasticity for $Var(y_{it}|x_{it})$ due to the fractional nature of the dependent variable.

In order to estimate the model, Papke and Wooldridge (2008) developed Pooled Fractional Probit estimator (PFP) which maximizes the pooled probit log-likelihood. Papke and Wooldridge (2008), also show how to solve the potential endogeneity problem of this model by using a control function approach. For the first step of the two-step estimation method, each potentially endogenous variable is regressed on all other independent variables in the model. In the second step, the residuals from these first step regressions are included in the original model along with potentially endogenous variables.

In this study, the two-part Fractional Regression Model (2-part FRM) is employed along with a control function approach for the fractional regression model estimation in the second step. This approach enables to differentiate between the variables that affect the debt decisions of both unleveraged and leveraged firms. Thus, the coefficients for the same independent variable in these two models are allowed to be different.

7. Analysis of results

In the first stage of the two-part analysis, the binary response model is run. The results are reported in Table 1. Standard errors of coefficient estimates are reported in parentheses.

Table 1
Results for the binary response model of 2-part FRM.

Dependent Variable	Leverage Dummy
Factoring Variable	0.009 (0.031)
Profitability	−4.092* (2.178)
Tangibility	2.529** (1.218)
Firm Size	0.564*** (0.123)
Liquidity	−0.297*** (0.116)
Non-debt Tax Shield	7.328 (14.693)
Industry Leverage	14.257*** (4.388)
Inflation	−4.043 (3.138)
GDP Growth	335.421 (251.593)
Constant	16.667 (19.901)
Time Effects	Yes
Number of Observations	1482
Number of Groups	247
Time Period	2012–2017

This table shows the results of the binary response model of the 2-part FRM based on Ramalho and da Silva (2009) and Ramalho et al. (2011). See Table S2 for the variable definitions. The variance-covariance was estimated using Sandwich estimators with correction for clustering on firms. Robust standard errors are presented in parentheses. "*", "**" and "***" indicates significance at 10%, 5% and 1%, respectively.

The coefficient of factoring variable is insignificant in binary response model. Thus, we cannot detect any relationship between an unleveraged firm's initial decision to use debt and its factoring financing. In other words, H_0 given in section in section 4 is failed to reject. This result is in line with our earlier assumption that factoring does not affect the initial debt decision.

In accordance with the previous literature, the findings show that firm size and tangibility have statistically significant and positive coefficients (Frank & Goyal, 2009; Graham & Leary, 2011; Harris & Raviv, 1991; Rajan & Zingales, 1995). Thus, firm size and tangibility are important firm-level determinants of a firm's initial decision of using debt financing. Since large firms are reputable in the debt market, they have higher credibility and lower cost of debt. Thus, they are keen on debt financing. In addition, firms with a large size of tangible assets can use them as collaterals for easing their borrowings.

In accordance with our expectations, liquidity variable has a negative and significant relationship with leverage dummy. Thus, firms with high current ratios are less likely to use debt. Profitability also has a negative coefficient estimate. However, it is only significant at 10% level.

Industry leverage also has a significant coefficient in Table 1. Hence, we can conclude that firms operate in industries with high average leverage ratios are more likely to use debt.

In the second stage of the two-part analysis, the fractional regression model is run to investigate the relationship between capital structure and factoring financing for only leveraged firms. The results are presented in Table 2.

Results of the linear random effects model are somewhat similar to the results of the fractional regression model in terms of the significance of some coefficients. However, there is a huge difference in terms of the magnitudes of these coefficient estimates. Firm size, which has no significant effect on leverage according to random effects model results, has a positive effect on book leverage ratio at 5%. Moreover, the significance of the coefficient of the liquidity vanishes when the fractional regression model is estimated instead of the random effects model. To sum up, Table 2 shows that there are some differences between the results of the fractional regression model and those of a random effects model.

The most remarkable finding of the fractional regression model is that factoring has a statistically significant and positive effect on both markets and book leverage ratios at 1%. Thus, our H_0 is rejected and it can be said that there is a positive relationship between the leverage ratio of an already leveraged firm and factoring financing. This result supports our argument that leveraged firms use factoring as an alternative source of debt financing. If firms have optimal leverage ratios and their actual leverage ratios are approximately equal to their optimal, then, they will try to find alternative sources of debt financing. Factoring is a preferable option for them since it is not detectable in financial statements and thus, will not change the estimated leverage ratio. Consequently, the leverage ratio will be higher for firms with factoring financing.

Table 2
Results for the fractional regression model of 2-part FRM.

Dependent Variable	Random Effects Model		Fractional Regression Model	
	Market Leverage Ratio	Book Leverage Ratio	Market Leverage Ratio	Book Leverage Ratio
Factoring	0.130***	0.172***	0.481***	0.475***
Variable	0.038	0.037	0.156	0.129
Profitability	−0.260***	−0.154	−1.632***	−0.244
	0.110	0.118	0.426	0.453
Tangibility	0.278***	0.204***	1.045***	0.537**
	0.050	0.057	0.214	0.217
Firm Size	0.006	0.008	0.031*	0.033**
	0.006	0.005	0.019	0.017
Liquidity	0.037**	0.049***	0.018	−0.070
	0.016	0.016	0.072	0.070
Non-debt	0.529	2.019***	1.503	7.467***
Tax Shield	0.484	0.732	2.272	2.390
Industry	0.594***	0.186*	1.620***	1.114***
Leverage	0.136	0.097	0.544	0.386
Inflation	−0.029***	−0.032***	−0.122***	−0.118***
	0.007	0.006	0.026	0.023
GDP Growth	−0.029	−0.269	0.950	0.101
	0.312	0.333	1.204	1.216
Constant	−0.126	−0.153	−1.791***	−1.587***
	0.101	0.104	0.376	0.349
Control Effect	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes
Number of Observations	1071	1071	1071	1071
Time Period	2012–2017	2012–2017	2012–2017	2012–2017

This table shows the results of the second step of the analysis. The estimation results of the random effects models with book and market leverage ratios as dependent variables are given at the first two columns. Then, the results of fractional regression models of the 2-part FRM based on Ramalho and da Silva (2009) and Ramalho et al. (2011) are presented. See Table S2 for the variable definitions. The variance-covariance was estimated using Sandwich estimators with correction for clustering on firms. Robust standard errors are presented in parentheses. "*", "**" and "***" indicates significance at 10%, 5% and 1%, respectively.

In line with the previous literature, profitability has a negative and significant relationship with the market leverage ratio (Frank & Goyal, 2009; Graham & Leary, 2011; Harris & Raviv, 1991; Rajan & Zingales, 1995). This finding is consistent with the arguments of the pecking order theory. Firms with a higher level of profitability prefer to use lesser debt.

Besides, tangibility and firm size are found to have positive relationships with leverage ratio, which are in accordance with the trade-off theory. Since fixed assets are accepted as collaterals in debt contracts, firms with higher tangibility ratios can borrow more. Large firms have more credibility in the debt market and have a lower bankruptcy probability. Thus, their cost of debt is lower, compared to small, unknown firms.

As expected, the industry leverage ratio is a strong determinant of capital structure. Leveraged firms operating in industries with high mean leverage ratios, tend to use more debt financing. Lastly, the inflation rate is found to have a strong negative relationship with leverage ratios. When the inflation rate is low, firms increase their leverage ratios, vice versa.

According to the pecking order hierarchy, once firms decide to use external financing, they prefer debt financing to equity financing due to their respective costs. Leverage ratio increases with increasing debt until the increasing cost of debt prevents firms from the use of bank loan financing. Then, firms may engage in the liquidation of their account receivables to satisfy their financing needs. Factoring is the most effective method for this process. Thus, the pecking order hierarchy may be re-ordered with the inclusion of factoring financing.

However, a financial market structure may cause dissonance in the re-ordered pecking order hierarchy. The suggested hierarchical order of financing options may need to be re-evaluated based on the market structure. Leveraged firms have two main constraints to access conventional financing tools: reaching the limits of their credit line and the lack of providing collateral. However, to sustain their operations, they need to access alternative financial sources like factoring. Since the factoring market itself depends on bank loans, the sources of financing through factoring is finite. Thus, firms engage in factoring financing and continue to push employing conventional financing options such as bank loans at the same time. Fig. 3 displays the dissonance effect in the hierarchy.

On the other hand, this dissonance also affects the firm value. As shown in Fig. 4, firms increase their use of both bank loan and factoring financing simultaneously until they reach their optimal leverage ratio. Thus, firm value curve moves up to the dotted curve, which represents the maintenance level for this period. Once they reach their optimal leverage ratio, factoring financing options in the market diminish and firms opt for further bank loan financing and equity financing options simultaneously to maintain their optimal capital structure.

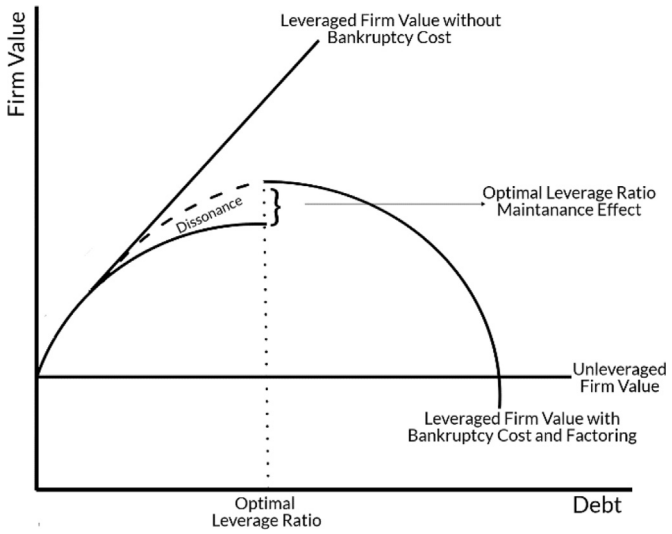

Fig. 4. Effects of leverage and factoring financing dissonance on the firm value.

8. Conclusion

This study set out to assess the role of factoring financing on the capital structure decisions of publicly listed firms in Turkey. A two-part fractional regression model is employed to analyze a panel data of 261 firms for the years 2012–2017. For the first stage of the analysis, we investigate the role of factoring on the decision of initial leveraging. Following our expectations, we found that factoring financing does not affect an unleveraged firm's decision to use debt. In the second stage, the role of factoring in capital structure decisions of leveraged firms is investigated. We found a statistically significant and positive relationship between leverage ratio and factoring as the most notable finding of this study. This finding implies that factoring is an alternative external financing option for leveraged firms.

The results of this study develop a new understanding of the well-known capital structure theories. In terms of the trade-off theory, the expense of factoring financing acts as a tax-shield without increasing the bankruptcy cost. However, it is not the initial choice of debt financing for many firms since it is costly compared to bank loan. Firms use bank loan financing until they reach their optimal capital structure. Then, they opt for factoring financing to increase their values. The use of factoring continues as far as the utilization of all available factoring financing possibilities in the market.

On the other hand, the pecking order hierarchy implies that firms prefer bank debt to factoring because of its relatively lower cost. Since non-bank financing is also a form of debt, firms should prefer it to equity financing. Thence, factoring financing needs to be placed between bank debt and equity financing in the hierarchy. Besides, non-financial benefits of it, such as window-dressing of the balance sheet, may determine the order of the hierarchy. For example, publicly listed firms may not follow the order for the sake of trading volume and market liquidity. As a result, it is arguable if the hierarchy can be validated under all circumstances.

This study extends our knowledge of the relationship between factoring and capital structure. Further research is required in this field in order to generalize the findings in this study.

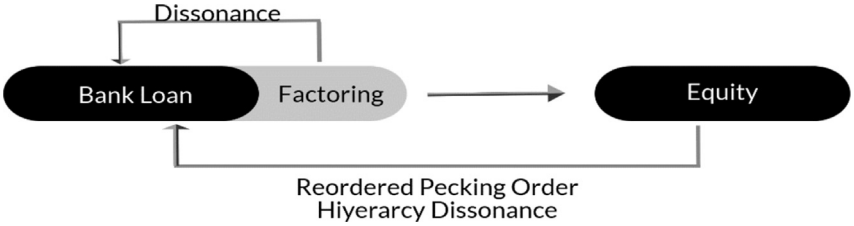

Fig. 3. Reordered pecking order hierarchy dissonance.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bir.2019.05.001.

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